MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2016/2017

TIS3151 – SOFTWARE RELIABILITY AND QUALITY ASSURANCE

(All sections / Groups)

27 February 2017
9.00 a.m – 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 5 pages excluding the cover page with 5 Questions only.

2. Attempt all **FIVE** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please print all your answers in the Answer Booklet provided.

QUESTION 1

a. It is claimed that no significant Software Quality Assurance (SQA) activities are expected to take place during the phase of production planning for software products.

(i) Is this claim correct? Justify your answer.

[2 Marks]

(ii) Compare the required production planning for a new automobile model with the production planning efforts required for the new release of a software product.

[3 Marks]

b. The Therac-25 medical radiation therapy device was involved in several cases where massive overdoses of radiation were administered to patients in 1985-87, a side effect of the buggy software powering the device. A number of patients received up to 100 times the intended dose, and at least three of them died as a direct result of the radiation overdose.

Identify the cause of software error and explain your answer.

[3 Marks]

c. OneUniversity system will be implemented in ABC University will be used to manage undergraduate students and allows students to perform subject registration, scheduling, viewing attendance, exam results and other activities. Based on the McCall's factor model, provide examples of requirements for the following implicit attributes that need to be adhered when developing OneUniversity system.

[4 Marks]

Attribute	Requirement
Correctness	
Reliability	
Flexibility	
Portability	

Continued...

QUESTION 2

a. One of the principles of ISO 9001:2008 is "*Customer Focus*". Explain this principle and provide one benefit of this principle.

[2 Marks]

b. Explain "*Process Institutionalization*" in CMMI.

[1 Mark]

c. Provide explanation for the following failure classes pertaining to a banking system.

[3 Marks]

Failure class	Explanation
Permanent	
Transient	
Recoverable	
Unrecoverable	
Corrupting	
Non-corrupting	

d. Identify and explain the error in the following lines of codes and re-write the correct code.

[3 Marks]

```
1. int * ptr , m = 100 ;
2. ptr = m ;
```

e. Provide the output for the following Java program:

[2 Marks]

```
class Example2{
public static void main(String args[]){
    try{
      int a[]=new int[7];
      a[4]=30/0;
      System.out.println("First print statement in try block");

     }
     catch(ArithmeticException e){
     System.out.println("Warning: ArithmeticException");
     }

     catch(ArrayIndexOutOfBoundsException e){
     System.out.println("Warning:ArrayIndexOutOfBoundsException");
    }

    catch(Exception e){
    System.out.println("Warning: Some Other exception");

    }
    System.out.println("Out of try-catch block...");
    }
}
```

Continued...

f. Define the term '*Defensive Programming*'.

[1 Mark]

QUESTION 3

a. Answer the following questions based on the diagrams below.

(i) Identify which one represents black-box testing and which one is white-box testing.

[1 Mark]

(ii) Explain your answers in (i).

[1 Mark]

(iii) Provide **ONE** disadvantage for each type of testing mentioned above.

[2 Marks]

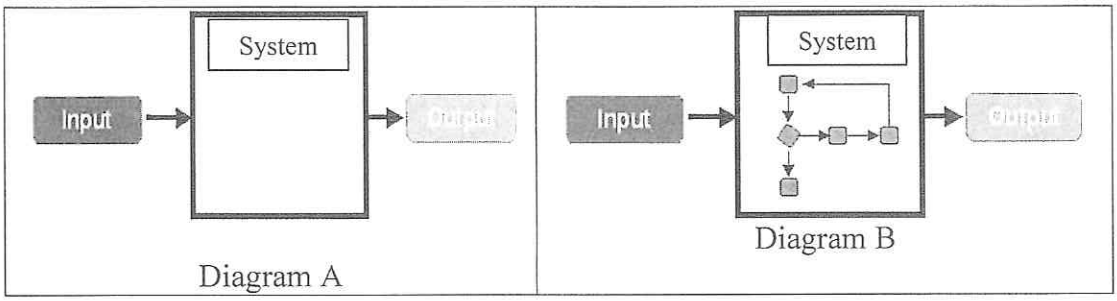
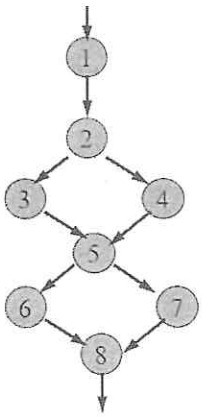


Diagram A

Diagram B

b. Identify different path coverage that will be created during white-box testing for the diagram below.

[2 Marks]



c. Differentiate between formal design review and peer review in terms of the participants and authority.

[4 Marks]

Continued...

Review Methods	Participants	Authority
Formal design review		
Peer review		

d. Assume that the HR department in the company that you are working has requested you to build a payroll system. Discuss **TWO** important reasons for conducting contract review for such system.

[2 Marks]

QUESTION 4

a. You were told to conduct Function Point (FP) analysis for a project assigned to you. Based on the requirement elicitation and analysis process, you have classified the requirements based on the categories below together with its counts and complexity.

Software System Components	Count	Complexity
User Inputs	15	Rated complexity as simple
User Outputs	5	Rated complexity as average
User Online Queries	10	Rated complexity as average
Logical Files	30	Rated complexity as complex
External Interface	20	Rated complexity as average

(i) Use the template below to calculate Crude Function Point (CFP) based on the information above.

[3 Marks]

Software System Components	Complexity Factor				
	Count	Simple	Average	Complex	Total CFP
User Inputs		3	4	6	
User Outputs		4	5	7	
User Online Queries		3	4	6	
Logical Files		7	10	15	
External Interface		5	7	10	
				Total CFP	

Continued...

(ii) Assume that the Relative Complexity Adjustment Factor (RCAF) is 41. Calculate the FP for the project assigned to you.

[1 Mark]

b. Explain **THREE** circumstances in which the content of Verification and Validation Plan (VVP) will change.

[3 Marks]

c. Identify **THREE** activities that will be conducted during the testing phase in verification and validation process.

[3 Marks]

d. Explain the purpose of '*Software process productivity metrics*'.

[2 Marks]

QUESTION 5

a. Explain the activities that can be performed at each stage of Plan Do Check Act (PDCA) cycle.

[4 Marks]

b. According to Total Quality Management (TQM), a quality product comes from a quality process. Elaborate this statement.

[2 Marks]

c. How to minimize creeping featurism while remaining tuned to a changing environment?

[2 Marks]

d. When a company begins to manage its risks, it identifies all the places in its organization where it is or has the potential of being "at risk". Identify **FOUR** factors that need to be considered when identifying risks.

[4 Marks]

End of page.